REMARKS

Overview of the Office Action

Claims 102, 103, 114, and 115 have been rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the enablement requirement.

Claims 1, 14, 102, 103, 112, 114, and 115 have been rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,834,036 ("Shiono") in view of U.S. Patent No. 6,870,805 ("Arai").

Claims 105, 106, 117, and 118 have been rejected under 35 U.S.C. §103(a) as unpatentable over Shiono in view of Arai, and further in view of U.S. Patent No. 6,807,019 ("Takeuchi").

Claims 111 and 123 have been rejected under 35 U.S.C. §103(a) as unpatentable over Shiono in view of Arai, and further in view of U.S. Patent No. 6,594,222 ("Maruyama").

Status of the claims

Claims 1 and 112 have been amended.

Claims 2-10, 12-13, 45-50, and 99 have been previously canceled.

Claims 102, 103, 111, 114, 115, and 123 have now been canceled.

Claims 11, 15-44, 51-98, 100-101, 107-110, 113, and 119-122 have been withdrawn.

Claims 1, 14, 104-106, 112, and 116-118 remain pending.

Rejection of claims 102, 103, 114, and 115 under 35 U.S.C. §112, first paragraph

The Office Action states that claims 102, 103, 114, and 115 have been rejected for failing to comply with the enablement requirement.

Claims 102, 103, 114, and 115 have been canceled. Therefore, this rejection is now moot.

Rejection of claims 1, 14, 102, 103, 112, 114, and 115 under 35 U.S.C. §103(a)

The Office Action states that the combination of Shiono and Arai teaches all of Applicants' recited elements.

Independent claim 1 has been amended to recite, in part, an optical pickup apparatus "wherein the diffraction order number of the light flux of the wavelength $\lambda 3$ having passed the different diffractive structure is different from the diffraction order number of the light flux of the wavelength $\lambda 3$ having passed the first diffractive structure", which Shiono, Arai, and Maruyama fail to teach or suggest. Support for the claim amendments can be found in original claim 111.

On page 6, third paragraph of the Office Action, the Examiner concedes that Shiono and Arai both fail to teach or suggest the above-mentioned limitation.

However, the Examiner cites Fig. 3a and col. 11, lines 25-54 of Maruyama as teaching Applicants' recited limitation. Applicants submit that Maruyama has been misunderstood.

Maruyama discloses an objective lens of an optical pick-up. The objective lens includes a refractive lens and a diffractive lens structure that is formed as a large number of concentric ring areas having minute steps in an optical axis direction at the boundaries therebetween (see Figs 1a and 1b of Maruyama).

The lens surface of the objective lens of Maruyama is divided into a high numerical aperture (NA) exclusive area (RE) (used for a DVD only), and a common area (RC) surrounded by the high NA exclusive area (RE) (see col. 5, lines 53-64). The diffractive lens structure of Maruyama in the common area changes the spherical aberration in the undercorrected direction as the wavelength of the incident laser beam increases (see col. 6, lines 52-59). The diffractive lens structure of Maruyama formed in the high NA exclusive area (RE) has a smaller wavelength dependence of a spherical aberration than that formed in the common area (RC), and is designed such that a spherical aberration at the short wavelength is adequately corrected for the thin cover type optical disc, such as a CD (see col. 7, lines 5-10 and the abstract of Maruyama).

The Examiner cited passages of col. 11, lines 25-54 and Fig. 3a of Maruyama simply disclose that the lens (10) of Maruyama includes a first surface (11) and a second surface (12), and that first surface (11) of Maruyama includes a common area surrounded by the high NA exclusive area. The cited passages of Maruyama also describe the various coefficients that define the base curve and the diffractive lens structure of the common area (RC) of the first surface (11), the various coefficients that define the base curve and the diffractive lens structure of the high NA exclusive area (RE) of the first surface (11), and the various coefficients that define the second surface (12). An equation used to define the rotationally-symmetrical aspherical surface of the lens of Maruyama is also disclosed.

Nowhere in the cited passages of Maruyama is it taught or suggested that the diffraction order number of the light flux of the wavelength $\lambda 3$ having passed the different diffractive structure is different from the diffraction order number of the light flux of the wavelength $\lambda 3$ having passed the first diffractive structure, as now recited in Applicants' amended claim 1.

As is known to those skilled in the art, the order number of diffracted light m, can be calculated using the following formula,

$$m = (n-1) \times d_s / \lambda;$$

where m is the order number, n is the refractive index of the optical element, d_s is the distance of the minute step in the direction of the optical axis, and λ is the wavelength of the incident light flux.

As is also known by those skilled in the art, if the order number m is between 0.51 and 1.49, the order number m is deemed to be 1. Further, if the order number m is between 1.51 and 2.49, order number m is deemed to be 2.

Using the above formula and the values disclosed in Table 1 (first embodiment) and Table 3 (second embodiment) of Maruyama, the various order numbers m can be calculated, and are shown in the table below.

Embodiment of Maruyama	Index of refraction (n)	λ	d_s for RC	Order number (m) of the light flux of common area (RC)	d_s for RE	Order number (m) of the light flux of High-NA exclusive area (RE)
1st Embodiment (col. 11, line 25 to col. 12, line 40; table 1)	1.54059	656 nm	1337.2 nm	1 (1.102)	1215.4 nm	1 (1.002)
1st Embodiment	1.53653	790 nm	1337.2 nm	1 (0.908)	1215.4 nm	1 (0.825)
2nd Embodiment (col. 14, line 45 to col. 15, line 25; table 3)	1.54048	659 nm	1340 nm	1 (1.099)	1223.7 nm	1 (1.004)
2nd Embodiment	1.53653	790 nm	1340 nm	1 (0.910)	1223.7 nm	1 (0.831)

The above table shows that, in both embodiments of Maruyama, the diffraction order number m of the light flux that has passed through a diffractive structure of the common area (RC) is <u>same</u> as the diffraction order number m of the light flux that has passed through a diffractive structure of the high-NA exclusive area (RE).

In contrast to Maruyama, Applicants' amended claim 1 clearly recites "wherein the diffraction order number of the light flux of the wavelength λ3 having passed the different diffractive structure is <u>different</u> from the diffraction order number of the light flux of the wavelength λ3 having passed the first diffractive structure". Therefore, Maruyama clearly fails to teach or suggest the elements of Applicants' independent claim 1 that Shiono and Arai are missing.

In view of the foregoing, Shiono, Arai, and Maruyama, whether taken alone or in combination, fail to teach or suggest the subject matter recited in Applicants' amended independent claim 1. Accordingly, claim 1 is patentable over Shiono, Arai, and Maruyama under 35 U.S.C. §103(a).

Independent claim 112 has been amended to recite limitations similar to amended independent claim 1 and is therefore deemed to be patentably distinct over Shiono, Arai, and Maruyama for reasons discussed above with respect to independent claim 1.

Dependent claims

Claims 102, 103, 114, and 115 have been canceled. Claims 14, which depends from independent claim 1, incorporates all of the limitations of independent claim 1 and is therefore deemed to be patentably distinct over Shiono, Arai, and Maruyama for at least those reasons

discussed above with respect to independent claim 1.

Rejection of claims 105, 106, 117, and 118 under 35 U.S.C. §103(a)

The Office Action states that the combination of Shiono, Arai, and Takeuchi teaches all of Applicants' recited elements.

Shiono and Arai have been previously discussed, and do not teach or suggest the invention recited in Applicants' amended independent claims 1 and 112.

Because Shiono and Arai do not teach or suggest the subject matter recited in Applicants' amended independent claim 1, and because Takeuchi does not teach or suggest the elements of claim 1 that Shiono and Arai are missing, the addition of Takeuchi does not remedy the above-discussed deficiencies of Shiono and Arai.

Claims 105, 106, 117, and 118, which depend from independent claims 1 and 112, incorporate all of the limitations of the respective independent claim and are, therefore, patentably distinct over Shiono, Arai, and Takeuchi for at least those reasons discussed with respect to independent claims 1 and 112.

Rejection of claims 111 and 123 under 35 U.S.C. §103(a)

The Office Action states that the combination of Shiono, Arai, and Maruyama teaches all of Applicants' recited elements.

Claims 111 and 123 have been canceled. Therefore, this rejection is now moot.

Conclusion

In view of the foregoing, reconsideration and withdrawal of all rejections, and allowance of all pending claims is respectfully solicited.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

Respectfully submitted,

COHEN PONTANI LIEBERMAN & PAVANE LLP
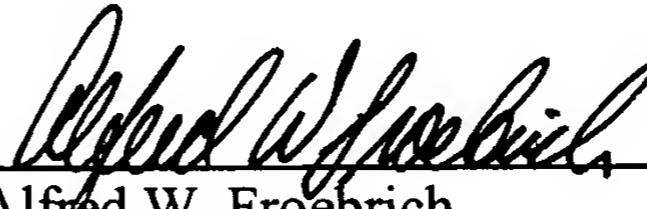
By _____
Alfred W. Froebrich
Reg. No. 38,887
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

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